CHAPTER 13

SUSTAINABLE FOREST MANAGEMENT: CIRIACY-WANTRUP’S DEFINITION OF CONSERVATION IN TODAY’S FOREST RESOURCE CONTEXT

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Abstract: Economic theory has limitations when guiding normative decisions over long periods of time, but empirical estimates suggest that forest owners regularly make decisions based on short-term assessments that lead to long-term sustainability. Ciriacy-Wantrup’s 1952 definition of conservation – shifting resource use toward the future – is an interesting rule that leads from the short-term to the long-term. This rule is applied in a case study of America’s Forest Inventory and Analysis program using the Montréal Process criteria and indicators. The results provide a basis for discussing how to deal with ambiguity in our understanding of the future and guiding policy analysis.

1. INTRODUCTION

Sustainable forest management is, in one sense, what the normative side of forest economics was about historically. What are the ecological, economic, and social conditions under which a forest will be managed in perpetuity for valued goods and services? Over much of the last century, the focus was on sustained yield of timber, but the question of sustainable forest management is about the sustainability of yields or flows for any good or service (e.g., wildlife, watershed protection) or multiple combinations of desired results. We also can examine the likelihood of land remaining in forests as opposed to a more developed use, such as crop agriculture, housing, or commercial expansion. Our focus is on the narrower picture, but if
sustainable forest management does not make economic sense, the broader question of sustainable forested landscapes is mute.

Our instinct as economists and quantitative managers is to find optima. Both economists and ecologists often talk about sustainability as if there is a defined and measurable point where either sustainability begins or is the “best” of possible sustainable solutions. We begin our discussion by acknowledging the limitations of economic theory when seeking long-term optima. Risk, uncertainty, and ambiguity regarding the future make it difficult to be precise regarding the future, especially over the 30 to 100 plus years in forest production cycles. Optimal rotations are an idealized result that we hope guides us away from sub-optimal solutions.

However, we note several positive economic studies that suggest the future will flow from past and present economic, social, and ecological relationships. We are looking for workable solutions. In particular, we explore Ciriacy-Wantrup’s (1952) definition of conservation and the contemporary concern with “criteria and indicators for the conservation and sustainable management of temperate and boreal forests,” often referred to as the Montréal Process. In passing, we note several similar ideas suggested by other observers. We use an empirical case study of the USDA Forest Service’s recent experience with preparing the National Report on Sustainable Forests: 2003 (USDA Forest Service, 2003). The agency used the Montréal Process criteria and indicators and data from its Forests Inventory and Analysis (FIA) program and other sources to assess the nation’s movement toward sustainable forest management.

2. RISK AND UNCERTAINTY RESTRAIN THEORY REGARDING SUSTAINABLE FOREST MANAGEMENT

Over the past 25 years or so, several quantitative models have been developed and tested in context of particular timber markets. Berck (1979), Sedjo and Lyons (1990), and Berck and Bentley (1997), for example, used variants of dynamic programming to develop models that tested the rationality of timber owners vis-à-vis markets and timber prices. In each case, the authors concluded that the markets and players exhibited behaviour remarkably close to economic rationality or at least behaved as if they held “rational expectations” about the future. Although less rigorously tested, many other papers report results from analyzing data that has similar strong patterns (e.g., Holmes, Bentley, Hobson, & Broderick, 1990).

Berck and Bentley’s (1997) research on stumpage prices for old-growth redwood forests is an example of research that demonstrates forest owners and markets are reasonably good at making sound short-term economic decisions. Removals from total inventory were regular and steady, so supply shifted backward in a predictable fashion. Demand shifted in and out in response to a few cyclical factors, primarily housing starts. In this supply-demand dynamic, owners harvested timber at a rate that earned almost exactly 6% in real interest. The earnings were entirely from rises in real redwood timber prices because there was no physical growth or change in quality characteristics. Even more important, investment returns from old-growth redwood fit into a portfolio of investments with similar risk.